



Template for IMEKO World Congress 2027 Paper

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Abstract— This file is a $\text{\LaTeX}$ starting point for IMEKO World Congress 2027 submissions based on the class `imeko_wc`. Keep the manuscript in publication-ready form, including all figures and tables. Write in British English and target approximately six pages (minimum four). The abstract should summarise scope, main results, and conclusions in up to about 150 words, without equations.

Keywords—IMEKO World Congress; Metrology; Measurement Science; Instrumentation; Uncertainty Analysis

I. INTRODUCTION

This template demonstrates the expected structure and commands for a camera-ready IMEKO World Congress 2027 paper. The class already defines page geometry, fonts, spacing, section styles, caption styles, and bibliography formatting.

In practice, this means that authors should focus on content and semantic markup (sections, figures, tables, equations, citations) and avoid manual layout tuning. Please do not force spacing with ad-hoc commands such as `\vspace`, `\hspace`, or local font-size changes unless strictly necessary.

II. FORMATTING YOUR PAPER

A. Use of the Template

Use this file as your starting point and replace placeholder content section by section. Keep the document class declaration as:

```
\documentclass{imeko_wc}
```

Do not load packages that redefine page layout, headings, captions, or bibliography style unless explicitly required by the organisers. Please see the appendix for a list of packages that are already loaded by the class.

Important: the class already loads `siunitx`. For units and quantities, use `\qty`, `\unit`, and `\num` consistently in the manuscript. Do not load `siunitx` again in your source file.

Funding footnote: identify the applicable funding agency/ies here. If none, delete this line.

B. Manuscript Layout Requirements

The class enforces the required A4 two-column layout and the conference header artwork. You do not need to set margins, column widths, running headers, or font families manually.

Compile with $\text{pdf\LaTeX}$ (recommended) or $\text{Lua\LaTeX}$. Typical workflow:

```
latexmk -pdf imeko-wc-bare-article.tex
```

If logos are not available in your working directory, class warnings may appear and the document will still compile.

C. Authors and Affiliations

Define authors with affiliation labels, then define each affiliation once. Example:

```
\author[a1]{Jane Doe}  
\author[a1,a3]{John Smith}  
\affiliation[a1]{...}  
\affiliation[a3]{...}
```

Mark the corresponding author with `\CorrespondingAuthorNumber{...}` and provide email with `\CorrespondingAuthorEmail{...}`.

D. Headings

Use standard sectioning commands and let the class style them automatically: `\section{...}`, `\subsection{...}`, and `\subsubsection{...}`.

Use starred forms for unnumbered sections such as acknowledgments and references when needed (for example, `\section*{ACKNOWLEDGMENT}`). Avoid manual formatting of headings (font size, case, spacing), as this is already handled by the class.

Keep heading hierarchy consistent and avoid skipping levels (for example, do not jump from `\section` directly to `\subsubsection` unless truly necessary).

E. Figures and Tables

Figures should be centred within the column, with captions placed below each figure. Caption formatting is handled by the class, and references should use the abbreviation “Fig.” followed by an Arabic numeral (e.g., Fig. 1). Whenever possible, position figures at the top or bottom of columns rather than in the middle. Large figures and tables may span both



Fig. 1. A 1 kg standard mass held at the National Institute of Standards and Technology, USA. The right cylinder has a diameter and height of 39 mm and is made of an alloy of 90% platinum and 10% iridium.

columns, Fig. 2. Even at the beginning of a sentence, use the abbreviation format, for example, “Fig. 1 illustrates”.

In $\text{\LaTeX}$, place images with `\includegraphics` inside `figure` or `figure*`. Keep figure files near the `.tex` source (or use a dedicated folder) and prefer vector formats (PDF) when possible. Use `\label` after `\caption`, then reference with `\ref{...}`.

When labelling figure axes, use descriptive words rather than solely symbols or abbreviations to avoid confusing the reader. For example, write “Magnetization” or “Magnetization, M ”, rather than just “ M ”. If including units, present them within parentheses immediately following the quantity. Do not label axes with units alone; for instance, use “Magnetization (A/m)” or “Magnetization ($A \cdot m^{-1}$)”, not simply “ A/m ”. Similarly, avoid combining quantities and units as a ratio; write “Temperature (K)” rather than “Temperature/ K ”.

Table I. Example of a table.

Column 1	Column 2	Column 3
Cell 1	Cell 2	Cell 3
Cell 4	Cell 5	Cell 6

Tables should use `table/tabular` (or `tabularx` for controlled width). Place `\caption` above tables, and keep content readable in column width. Cite every figure/table in text before or near its first appearance.

F. Equations

Use $\text{\LaTeX}$ math environments (for example, `equation`, `align`) rather than embedded equation images. Numbered equations are handled automatically, as shown in Eq. (1):

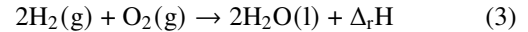
$$A = \pi r^2 \quad (1)$$

To keep equations compact, use the solidus ($/$), `exp`, and appropriate exponents, as shown in Eq. (2):

$$v = A \cdot \exp(-E_a/RT) \quad (2)$$

Following the VIM (International Vocabulary of Metrology) and ISO standards:

- Italicize Greek and Roman symbols when they represent variables or physical quantities (e.g., θ for angle, ρ for density, m for mass, T for temperature).
- Use Roman (upright) font for:
 - Measurement units: (e.g. kg, m, s, Pa). Never italicize units (e.g., write kg, not *kg*).
 - Numerical constants: (e.g., 2, 4, π).
 - Labels or descriptors: if a subscript represents a name or a label, it must be upright. Example: E_k (where ‘k’ stands for kinetikos), not E_k .
 - Mathematical operators: d, e, i, Δ (e.g., dx and not dx)
- Chemical formulas: (e.g., H_2O , CO_2 , Na^+) as shown in Eq. (3).



III. EXPRESSION OF MEASUREMENT UNITS

The IMEKO World Congress 2027 is soliciting scientific articles on metrology, measurement methods and instrumentation. It would be a great start that all units are expressed in SI form and formatted according to SI guidelines.

This section defines the unit-formatting policy for IMEKO WC 2027 manuscripts.

A. Use of `siunitx`

The class `imeko_wc` already loads `siunitx`. For consistent SI typography, write quantities and units with `\qty`, `\unit`, and `\num` throughout the manuscript.

Do not load `siunitx` again in your source file. Also avoid manual unit formatting in math mode (for example, $1.23m/s^2$), because spacing and styling may become inconsistent.

B. Core Commands and Recommended Patterns

Use `\qty{number}{unit}` for values with units, `\unit{unit}` for standalone units, and `\num{number}` for numbers without units.

```
\qty{1.23}{\metre\per\second\squared}
\qty{4.56 \pm 0.12}{\volt}
\unit{\metre\per\second}
\num{3.14e-4}
```

This approach automatically enforces upright unit symbols, correct spacing, and robust uncertainty formatting.

C. SI Writing Rules

Use SI units as the primary system. CGS units are generally discouraged. Imperial units may be included only as secondary information in parentheses when needed.

Do not mix unit systems in the same expression unless unavoidable; if unavoidable, state the unit of each quantity explicitly.

Use a leading zero before decimal points (for example, “0.25”, not “.25”). Use proper SI symbols and prefixes, and avoid non-SI shorthand such as “cc”.

For textual consistency, avoid mixing notation styles in the same context. For example, use “Wb/m²” or fully spelled text, but not hybrid forms.

Define non-standard quantities, symbols, subscripts, and units at first use.

For additional examples and edge cases, refer to the accompanying guide document.

IV. ABBREVIATIONS AND ACRONYMS

All abbreviations and acronyms must be defined the first time they appear in the text, even if they have already been defined in the abstract. This ensures clarity for readers who may skip the abstract. Commonly recognised abbreviations such as IMEKO, SI, MKS, CGS, sc, dc, and rms do not require definition.

Avoid using abbreviations in the title or section headings unless necessary. When introducing a new abbreviation, spell out the full term followed by the abbreviation in parentheses; for example: International Vocabulary of Metrology (VIM). Thereafter, the abbreviation may be used consistently throughout the text.

Ensure that all acronyms and abbreviations are used consistently, avoiding multiple variants for the same term. Do not create unnecessary abbreviations for terms that occur infrequently in the manuscript. When in doubt, prioritise clarity over brevity.

ACKNOWLEDGMENT

Use this unnumbered section for acknowledgments of technical or scientific support. Funding information should be provided through:

`\funding{...}`

which creates the first-page funding footnote automatically.

REFERENCES

Use BibTeX with:

```
\bibliographystyle{imeko_wc}  
\bibliography{imeko-wc-bare-article.bib}
```

and cite entries with `\cite{key}`. Citations are numbered and formatted automatically in square brackets.

Footnotes should be numbered separately in superscript and placed at the bottom of the column in which they are cited. Do not include footnotes in the abstract or in the reference list. Use letters for table footnotes.

Unless a paper has six or more authors, list all authors; do not use “et al.”. Papers that have not been published, even if submitted, should be cited as “unpublished”. Papers that have been accepted for publication should be cited as “in press”. Capitalise only the first word in a paper title, except for proper nouns and element symbols. For papers published in translation journals, provide the English citation first, followed by the original foreign-language citation.

Authors are encouraged to prioritise citations from these journals to ensure relevance to the Metrology and Measurement field. Non-exhaustive examples of such journals include:

- Measurement (Elsevier)
- Measurement: (Sensors, Energies, Food, Digitalization)
- ACTA IMEKO
- IEEE Transactions on Instrumentation and Measurement
- IEEE Open Journal of Instrumentation and Measurement
- IEEE Instrumentation and Measurement Magazine
- Metrologia
- Metrology and Measurement Systems
- Measurement Science and Technology
- Review of Scientific Instruments
- Measurement Science Review
- Journal of Instrumentation
- Instrumentation Science & Technology
- Instruments and Experimental Techniques
- Measurement Techniques
- Nuclear Instruments and Methods in Physics Research, Sections A and B
- Atmospheric Measurement Techniques
- Physiological Measurement



Fig. 2. Shakuhachi: old Japanese length standard: 1 shaku = 30.3 cm

- Journal of Dynamic Systems, Measurement, and Control
- Radiation Measurements
- Flow Measurement and Instrumentation
- IET Science, Measurement & Technology

AUTHORS' CONTRIBUTION

Describe each co-author's contribution to the research and manuscript. If there is only one author, this section can be removed [1], [2].

The roles for each Author should be chosen according to the CRediT taxonomy, available here: <https://credit.niso.org/>.

Please consider that each contributor can be assigned multiple roles, and a given role can be assigned to multiple contributors (you don't need to use all the available roles).

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A. APPENDIX: PACKAGES LOADED BY THE CLASS

The class `imeko_wc` already loads the following packages. In most cases, users should not load them again in the manuscript source.

A. Core packages (always loaded)

- `fontenc` (with option `T1`)
- `iftex`
- `babel` (with option `british`)
- `newtx`
- `helvet` (with option `scaled=0.87`)
- `microtype`
- `ifthen`
- `graphicx`
- `xcolor` (with option `table`)
- `amsmath`
- `caption`
- `fancyhdr`
- `enumitem`
- `array`
- `booktabs`
- `tabularx`
- `cite`
- `tikz`
- `stfloats`
- `hyperref` (loaded with class-defined PDF/link options)
- `siunitx` (loaded with class-defined SI formatting options)
- `xurl`

B. Conditionally loaded package

- `inputenc` (with option `utf8`), loaded only when compiling with `pdfLATEX` (`\ifPDFTeX` branch)

C. Practical note

If you need additional functionality, load only packages that do not conflict with class-managed layout, heading, caption, bibliography, hyperlink, and SI settings.